ABSTRACT

A method of monitoring turbine engines used in aircraft from sensor signals from an engine for a predetermined set of engine characteristics. The signals are transmitted to a

5   nonlinear engine model that predicts the output values for the given set of engine characteristics. The model generates residuals by calculating the difference between the actual values and the predicted values for each member of the set. The generated residuals are evaluated to estimate bounds of uncertainties as indicative of sensor noise. Incoming residuals from ongoing actual engine values are continuously tested against the bounds. A

10   fault is signaled for each of the set of characteristics when a detected bound is exceeded. A computer is usedto calculate the fault residual for each of the set of characteristics and the closest fault residual is selected as a diagnosed fault.